

REMARKS

The Office Action of March 27, 2001 has been carefully considered and reconsideration of the application as amended is respectfully requested.

Claims 1-11 are pending in the application. Claims 1-11 were rejected. Claims 1, 2, 8 and 9 have been amended.

The amendments to the claims are to expedite the prosecution by eliminating prolonged arguments over matters that are not of concern to our client regarding the patent application and are not directed to the patentability of the claims. They should therefore have no effect on the application of the doctrine of equivalents to the newly amended claims.

Claim Rejections - 35 U.S.C. Section 112, second paragraph

Claims 2, 8 and 9 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claims the subject matter which Applicant regards as the invention and for omitting essential structural cooperative relationships of elements.

Claim 2 was rejected because the expressions "medium paraffinic hydrocarbons" and "light paraffinic hydrocarbons" in lines 6 and 8, respectively, render the claim indefinite. The Examiner states that it is unclear if the medium and light paraffinic hydrocarbons in the claim are the same as the medium and light paraffinic hydrocarbons in claim 1.

Claim 8 was rejected because of the expressions "(in m²)" and "(in m³)" in lines 4 and

5, respectively. The Examiner states that it is unclear if the limitations in the parentheses are part of the claim.

Claim 9 was rejected because the expression "two of the streams" in lines 7 and 8 renders the claim indefinite. The Examiner states that it is unclear what are the two stream.

Amendments to the claims have been made addressing the issues raised by the Examiner. In particular, claim 1 has been amended to provide antecedent basis for light paraffinic hydrocarbons and medium paraffinic hydrocarbons. Claim 8 has been amended to remove the parentheses and the phrase "two of the streams" has been deleted from claim 9.

All claims as amended are believed to be sufficiently definite to satisfy the dictates of 35 U.S.C. 112, second paragraph.

Claim Rejection 35 U.S.C. 103(a)

Claims 1-5 and 7-11 were rejected under 35 U.S.C. 103(a) as being unpatentable over Posthuma et al. (U.S. Patent No. 5,486,542) in view of Bowman et al. (U.S. Patent No. 2,467,959). The Examiner alleges that Posthuma discloses a process for the distillation of a hydrocarbon mixture in which the mixture has been prepared by a Fischer-Tropsch synthesis. The Examiner states that the hydrocarbon mixture is fed into a vacuum distillation column to separate it into a light fraction and a heavy fraction. The column is operated at a temperature from 100 to 350°C. The Examiner further states that Posthuma also discloses that the hydrocarbon mixture has a carbon number of C₁₈ to C₄₀₊ and the light fraction comprises a C₁₈ to C₂₀ hydrocarbon and the heavy fraction comprises a C₂₁₊ hydrocarbon.

The Examiner admits that Posthuma does not disclose the column having a side stream and does not specifically disclose the dimensions and the physical characteristics of the distillation column. The Examiner states that Bowman discloses a process for separating a paraffinic feed into different fractions including side streams by using a distillation column.

The Examiner alleges that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Posthuma process by having at least one side stream as taught by Bowman because Bowman teaches that a paraffinic feed can be separated into at least 3 streams to obtain paraffin waxes of different melting point grades. Applicants respectfully disagree.

Posthuma et al teaches distilling hydrocarbon mixtures prepared by Fischer-Tropsch synthesis. The hydrocarbon mixture can comprise compounds having carbon numbers ranging from C_{18} to C_{40} and higher, (see column 4 lines 48-60). However, importantly, Posthuma et al only teaches distilling the hydrocarbon mixtures into two fractions, namely a first fraction having a low boiling point range and a narrow melting point range as a light product, and a second fraction having a high boiling point range and a wider melting point range, as a heavy product, (see col. 2 lines 1-7 and col. 4 line 48 to col. 5 line 6).

This is different from what is defined in the process of Claim 1. The paraffinic hydrocarbons of the present invention are distilled into at least **three** fractions or streams, namely an overheads stream, a bottom stream comprising usable wax products, and at least one side stream comprising usable wax products. Posthuma et al does not at all teach or suggest obtaining, through the distillation of Posthuma et al, at least one side stream

comprising usable wax products.

Thus, one having ordinary skill in the art at the time the invention was made would not have looked to Posthuma et al for a teaching thereof since Posthuma et al deals only with fractionating hydrocarbon mixtures into two fractions.

Furthermore, Posthuma et al specifically teaches the use of a **wiped film evaporator** which is not at all similar to the distillation column used in the present invention. Posthuma et al teaches that when such column distillation is effected at atmospheric pressure, thermal degradation of the hydrocarbons is experienced at the high temperatures at which the distillation must be effected, (see column 1 lines 26-39). Additionally, while Posthuma et al briefly mentions vacuum distillation columns, it does not deal at all with vacuum distillation columns and rather emphasizes that wiped film evaporators are advantageously used. Posthuma et al clearly teaches the substantial differences between a wiped film evaporator and a distillation column and specifically teaches away from using conventional column distillation, (see col. 3, line 25 to col. 4, line 4). Therefore, one having ordinary skill in the art at the time the invention was made would not look Posthuma et al to distill Fischer-Tropsch derived paraffinic hydrocarbons in a distillation column.

Bowman et al (U.S. Patent No. 2,467,959) does not at all teach that the wax can be Fischer-Tropsch derived. In fact, the feedstock of Bowman et al is specifically limited to paraffin wax, and primarily to de-oiled wax such as de-oiled slack wax. One having ordinary skill in the art at the time the invention was made would interpret the disclosure of Bowman et al as dealing exclusively with light and medium hydrocarbons. In other words, Bowman

et al does not at all deal with heavy hydrocarbons. This is supported by the melting point data given in the various tables of Bowman et al, and the fact that Bowman et al does not at all refer to vacuum distillation. Furthermore, Bowman et al does not at all teach the fractionation of heavy paraffinic hydrocarbons or heavy waxes. Therefore, one having ordinary skill in the art at the time the invention was made seeking to distill Fischer-Tropsch derived paraffinic hydrocarbons comprising at least heavy paraffinic hydrocarbons, would not at all look to Bowman for guidance in distilling such a feedstock.

To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art, *In re Royka*, 490 F.2d 981, USPQ 580 (CCPA 1974). It is thus respectfully submitted that, contrary to what is stated by the Examiner, a person skilled in the art, seeking to distill Fischer-Tropsch derived paraffinic hydrocarbons comprising at least heavy paraffinic hydrocarbons, to obtain an overheads stream, a bottom stream comprising usable wax products and at least one side stream comprising usable wax products as claimed in Claim 1, would not at all contemplate combining the teachings of Posthuma et al with those of Bowman et al.

Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-5 above, and further in view of Farnham (U.S. Patent No. 4,295,936). The Examiner admits that both Posthuma and Bowman do not specifically disclose that the bottom fraction is cooled and recycled back to the column. However, the Examiner alleges that it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Posthuma/Bowman process by recycling about 10% of the bottom fraction back to the column because Farnham discloses that pumping costs are

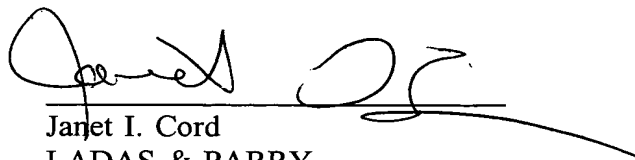
saved and the overall degradation rate is lower when recycling less than one-fifth the amount of the cooled bottoms to the column. Applicants respectfully disagree.

Farnham (U.S. Patent No. 4,295,936) teaches that a bottom recycle can be used to cool a bottom fraction in a distillation column. It is respectfully submitted that this is in the context of an energy efficient high temperature fractionation column and not at all in respect of either a wiped film evaporator as taught by Posthuma et al or the fractionation of de-oiled wax in accordance with Bowman et al. Therefore, one having ordinary skill in the art at the time the invention was made would not combine the primary references, Posthuma and Bowman, with Farnham to make the present invention.

Still further, Claim 6 depends from Claim 1 which, as discussed above, is clearly novel and inventive over Posthuma et al and Bowman et al when considered either individually or in combination. Therefore, Applicants respectfully submit that claim 6 is novel.

In light of the above, Applicants submit that all rejections of record have been overcome. Applicants accordingly submit that the application is now in condition for allowance and respectfully request action in accordance therewith.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Janet I. Cord", is written over a horizontal line.

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1.(amended) A process for distilling paraffinic hydrocarbons[, which process comprises]
comprising the steps of:

feeding a Fischer-Tropsch derived paraffinic hydrocarbon feedstock comprising heavy paraffinic hydrocarbons and, optionally, light[and/or medium] paraffinic hydrocarbons,
medium paraffinic hydrocarbons or a mixture thereof, into a distillation column;

operating the distillation column to produce usable wax products; and

withdrawing from the distillation column an overhead stream, a bottom stream comprising usable wax products, and at least one side stream comprising usable wax products.

2. (amended) A process according to Claim 1, wherein the Fischer-Tropsch derived paraffinic hydrocarbon feedstock comprises, in addition to the heavy paraffinic hydrocarbons [and] which comprise hydrocarbon molecules with carbon numbers or carbon atoms in the range C_{15} and greater, [also] the medium paraffinic hydrocarbons comprising hydrocarbon molecules with carbon numbers in the range C_{10} to C_{80} , and the light paraffinic hydrocarbons comprising hydrocarbon molecules with carbon numbers in the range C_{35} and less.

8. (Twice amended) A process according to Claim 1, wherein the distillation column contains structured packing as a distillation medium, with the structured packing having a surface area [(in m^2)] , in m^2 , to volume [(in m^3)] , in m^3 , ratio of 125:1 to 750:1.

9. (amended) A process according to Claim 8, wherein a plurality of the side streams are provided, with the distillation column including a draw point or zone for each of the side streams as well as for the overhead and bottom streams, and with a plurality of distillation

stages being provided in the distillation column, with each stage [being located between the draw points or zones for two of the streams, and with each stage] comprising the structured packing.